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Automation in Graphic Design

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ABSTRACT

Advances in technology have had dramatic impacts throughout history on a myriad of industries outside of the technology industry itself. These changes are showcased through a brief examination of the changes within the graphic design industry since the recorded birth of the graphic. With the advent of popularized artificial intelligence seen in the modern day, many are predicting the end of graphic design. Through an analysis of current automated design products within the consumer market and a dive into the research alongside design automation professional Peter O'Donovan, it is evident that the role of the graphic designer will most likely be forced to adapt to the changing landscape. However, while the role of the graphic design professional may pivot or disappear entirely, the need for a thoughtful design will likely persist for the foreseeable future.

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While mankind marches forward into advancement, its pace continuously quickens. Humanity is fascinated with the promises of tomorrow, and this fascination drives men to create and design as quickly and efficiently as possible. The evidence for this obsession with "the new" is shown man's overwhelming desire to consume the next big thing. Interest quickly shrinks for what is and grows for what is yet to come. This mentality has prevailed across time, as Alexander Pope commented on this phenomenon centuries ago, stating, "Man never is, but always to be blest" (Pope). Pope equates the desires of man to blessings and aptly states that the blessings that have been received pale in comparison to what has yet to be obtained. While presented as a negative critique of the heart of man, it is this very mentality that has propelled humanity forward through each passing generation building on the last. Upon reflection, it is seen that this advancement is a nonlinear process.

As more processes and inventions are created, there becomes an increase in the tools that are available to discover more processes and inventions tomorrow. Technology invented today will equip mankind to go further and do more than was thought possible yesterday. Ray Kurzweil deemed this idea The Law of Accelerating Returns when Kurzweil claims, "An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense 'intuitive linear' view. So, we won't experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress (at today's rate)" (Kurzeil). Kurzweil was prompted to make this claim when thinking of the rate of increase to microchips in computers, and the modern computing age has been a breeding ground for exponential change. Exponential growth

within computer chips has been coined under the term Moore's Law as depicted in Figure
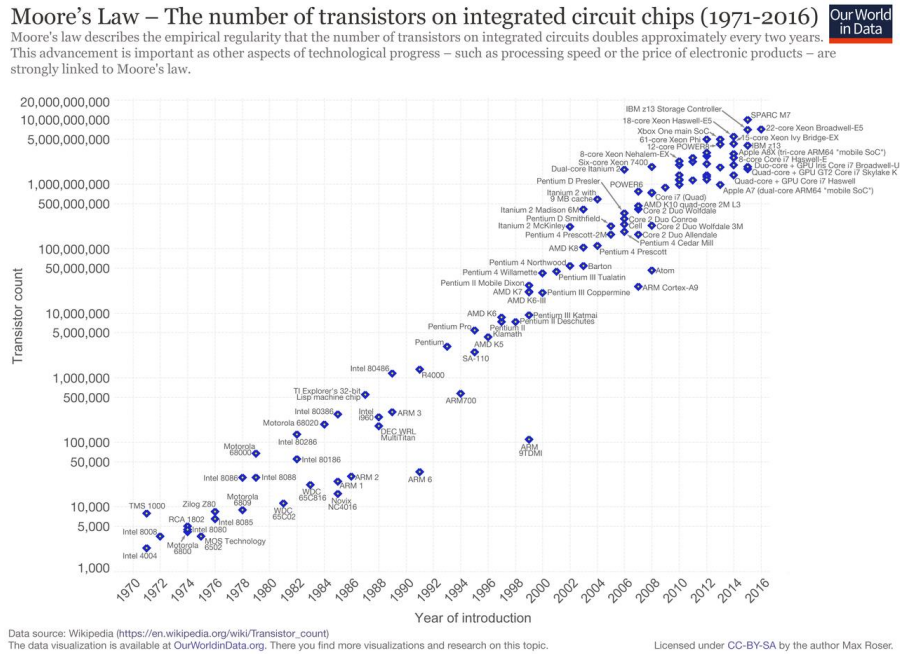
1.

Figure 1 Moore's Law Graph (Moore's Law- The number of transistors on intergrated circuit chips)

Moore's Law claims that processing power of computers doubles about every two years,

so according to this trend the computers of today will contain 32 times the processing

power compared to those 10 years ago. Processing power is a good measure of

technological capabilities of a machine as more processing speed means that a computer

can do more tasks in a shorter span of time. It is that link of computer capabilities and

their growth rates that helps to define the effects of technology within various industries

as the capabilities within technology and computing grows so does their applications.

One industry continuously shaped by the application of rising technologies is graphic

design, and as the industry changes so has the role of the designers.

The design industry is no foreigner to progress through change. History holds

multiple key moments where the role of the designer has shifted, and this redefining of

design expression is altered most through technological advancements. The Merriam

Webster definition of the noun design is, "the arrangement of elements or details in a

product or work of art" (Merriam-Webster, Design), so for one to be considered a

designer all one needs is some form of element of which to plan its arrangement. For the

purpose of this paper the focus will be put on designing graphics which Webster defines

as, "the art or science of drawing a representation of an object on a two-dimensional

surface according to mathematical rules of projection" (Merriam-Webster, Graphic). The

first recorded instance of a human designing a graphic has been recorded on the Iberian

Peninsula within the Cave of Altamira photographed in Figure 2 (Cave of Altamira and

Peleolithinc Cave Art of Northern Spain).

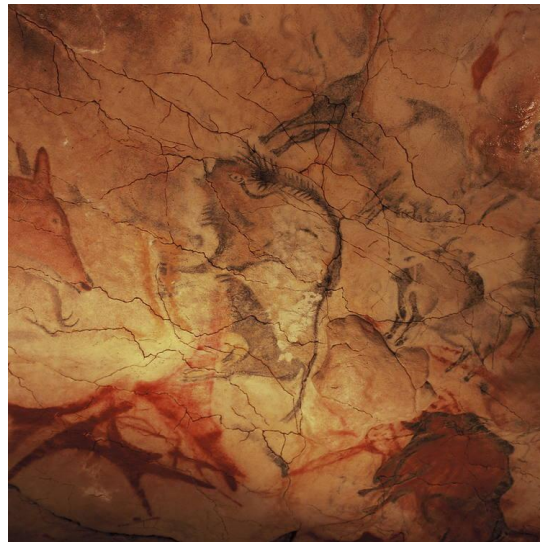*Figure 2 Cave of Altamira drawings (Cave of Altamira and Peleolithinc Cave Art of Northern Spain)*

These cave drawings are dated between 35,000 to 11,000 BC which pre-dates any

recorded written form of language by up to 30,000 years (Mark). While the drawings may

seem at first similar to a simple sketch, to be able to produce any form of graphic at that

point in history in certainly a great achievement.

Continuing forward, another major development that altered the role of the designer came when written language was first invented. Being able to translate complex ideas through imagery coupled with text on some form of medium such a papyrus or stone tablets changed history. In many ways history was altered because this marked the first-time humanity began to record events or moments- even if they mostly comprised of accounting logs for debtors (Harford). The effects of language would explode once again in 1436 at the hands of Johannes Gutenberg and his printing press illustrated in figure 3. For the first time in history, media publications could be mass produced at an affordable rate (Britannica).

Figure 3 illustrated representation of Gutenberg's printing press (Britannica)

Notably, it was around this same time (1476) copper engravings begin to be utilized for the reproduction of images (Unwin, Unwin and Editors of Encyclopaedia Britannica). This meant everything for the designer as reproducible media would allow for information to be spread across the globe. The invention of the printing press also stands as one of the initial steps in automating graphic design. Prior to this point, to create a second copy of a manuscript, someone such as a monk would be tasked with hand

lettering another version from scratch. Then any illustrations within the manuscript would be recreated best they could be. This process was extremely time consuming and produced a very low volume of work. However, with the automation of the lettering process the time required to output work was reduced dramatically and would soon beckon in a new era of design through the adoptions of the frequent magazine and newspaper.

Over 200 years after Guttenberg's invention of the printing press the German theologian Johann Rist started what is considered to be the earliest magazine- *Erbauliche Monaths-Unterredungen* or "Edifying Monthly Discussions" (O'Barr). The publication of the magazine changed the graphic design field as a larger volume of print media entered the hands of the general populations. The increased frequency of these publications created more emphasis on layout design. While books previously had general best practices, a frequent publication is able to alter its layout to the changing social dynamics much quicker thus creating or enforcing design trends. Alongside the layout, the increasing industrial era and rise of consumerism created the demand for advertisements to be placed inside these periodical publications (O'Barr). Selling goods is as old as mankind, but having a recognizable brand or product only started to become widespread after a reliable publishing medium. As advertisements and other print media became high demand across all industries so did the designer, and this theme is still seen today.

While graphic design principles have prevailed through history, the term graphic design is widely regarded to have been coined by W.A. Dwiggins. Dwiggins used the term in his article *New Kind of Printing Needs New Design* published in the Boston Evening Transcript Aug 29th 1922. Until then previous graphic design work fell under different

titles. Things such as illustrator or typographer which is what Edward Johnson was considered when he created the iconic identity for the London Underground represented in figure 4 (London Transport Museum).

Figure 4 London Underground sign (London Transport Museum)

Almost a century later and the term graphic designer is still used today, and Webster now defines it as, "the art or profession of using design elements (such as typography and images) to convey information or create an effect." During this century another major shift in automating the practice came with the invention of the computer.

After computers stormed onto the scene the previously tedious process of lettering and aligning elements for print became as easy as selecting the objects on a screen and hitting the align button. This automation lowered the barrier of entry immensely as access to a computer has become more commonplace. Now anyone interested in the art of graphic design can search for some easily accessible software, and within the span of an afternoon he or she can output designs ready for printing or posting. The rapid pace and availability of design tools has molded the role of the modern designer. Turning the lens forward starts to beg the question, "What role will the designer play in the future? Will the automation process push out designers entirely?" To dive into these questions, we

will take a look at the state of design software in the consumer sector and compare it to

the research being done in the private sector as well as professional opinions within the

field.

Figure 5 Adobe's Big Three Programs (Powell)

Today, in 2019, Adobe Inc. has a dominate hold on the creative software market.

Counting from their website, they include more than 20 programs with their Creative

Cloud subscription, but within the field of graphic design there is no question that

InDesign, Photoshop, and Illustrator are their big three. Photoshop stands out among the

rest as it has become a household name. To many, even the action of editing a photo is

known as "Photoshop-ing it." This monopoly of creative software was not always the

case as programs such as Quark Express were first on the scene at the dawn of computer

assisted graphic design, but those days vanished once Adobe released InDesign. This

strategy has continued as whenever any similar or creative product breaks into the market

Adobe will create their own version of it and add it to their Creative Suite. Currently in

Georgia Southern University's graphic design program students focus mostly on

mastering these major three programs along with a few other notables such as After

Effects. Based on the history as discussed previously, this would not be the case 40 years

ago as back then a graphic designer's toolkit would center around physical rulers and

knives to layout their designs. While the Adobe programs are still complex there are many quality of life changes presented through using a software program as opposed to the physical method. Luxuries such as precise built in measuring and print previews can be found in programs that the previous generation of designers were not afforded. Lowering these barriers in the design field has allowed for more and more people to dive into the graphic design process, however mastering the software is a major barrier.

What the major three Adobe products do not do, however, is train the designer on the proper principles and practices to make appealing work. InDesign will ensure elements on the page are aligned but does not make the decision about the best method of alignment. That is where templates come in. Templates have served to overcome the age-old problem of staring at a bank canvas by serving as a starting point to add graphics and media on top of. This allows for those not as skilled in design to create a very professional product because a designer created the template, and all the next person did was fill it in with their own photos or text. An area of design flooded with templates has recently been the web design industry. Below is a screenshot of the templates page found on Wix, a platform which boasts about untrained users quickly creating professional websites for their personal or business use.
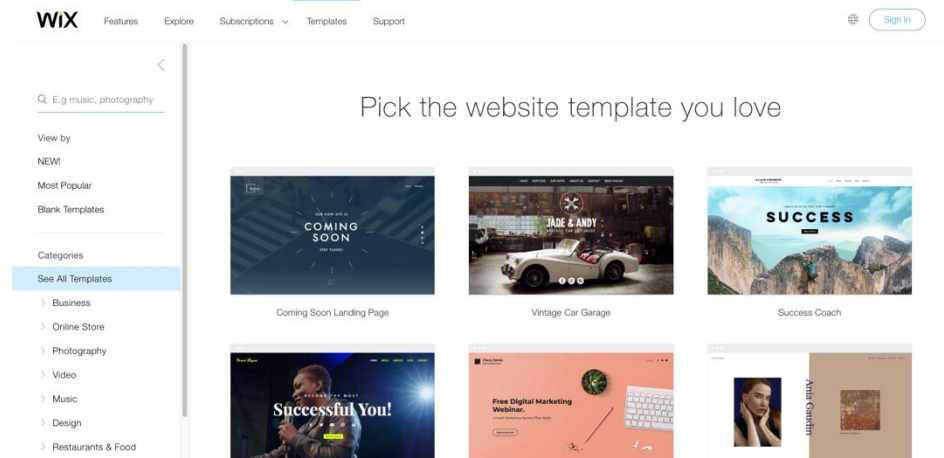
Figure 7a Wix Templates (Wix)

As seen in the image, there are many different styles to choose from that get updated to follow the newest trends in the web design world. Templates can also be found and manipulated in other programs such as Illustrator, and they work great for someone with no experience looking to create something like a one-time flyer. The issue that arises with templates is when someone wants to customize an aspect for their specific purpose or if someone is concerned about having something that looks more or less the same as something else. If two websites start form the same template then often many aspects of them will look alike. Design researchers and companies like Adobe have been exploring better methods at automating the design process even further as a way to solve these issues.

During his PhD in Computer Science at the University of Toronto, Peter O'Donovan began researching methods to further the template approach. Unsatisfied with static templates he created a system of what could be considered a "Smart Template" program called DesignScape. As shown below in figure 7, users place their elements on the screen then they are shown live updates of either brainstorming suggestions or

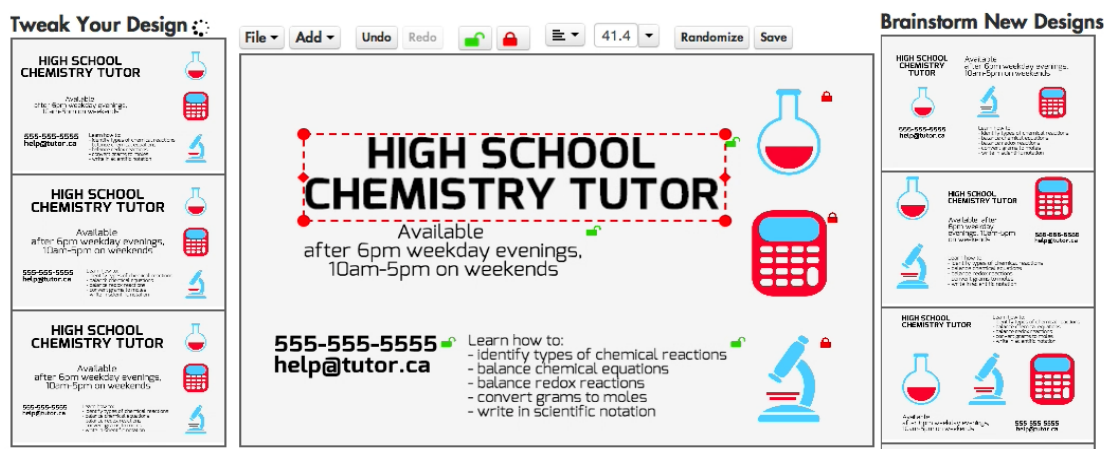refinements (O'Donovan, Agarwala and Hertzmann, DesignScape: Design with Interactive Layout Suggestions).

Figure 7 Screen shot of DesignScape (O'Donovan, Agarwala and Hertzmann, DesignScape: Design with Interactive Layout Suggestions)

The refinements shown on the left, also listed under "Tweak your Design," offer small adjustments to the current layout to help better utilize good design practices within the layout. These refinements appear to focus mostly on resizing, and slightly relocating the elements for more effective alignment. Next, the brainstorming tab on the right serves to offer greater possible changes to the current layout in fresh new ways the user may not have considered. The standard workflow would consist of: a user placing their desired elements onto the center workspace, using the brainstorming section to pick a general direction to start working, then continuing to manipulate the elements with small adjustments through the click and drag workspace or "Tweak Your Design" column. If at any point the designer wanted to change gears and go another direction completely the brainstorming column is always there with live updates to offer a new direction at the click of a button. It is worth mentioning that Adobe hinted at implementing a system similar to that seen in DesignScape into their Illustrator product, but there had yet to be anything shipped out to consumers as of Spring 2019 (Tselentis).

Peter's research on DesignScape has actually had a direct impact on the current product space as he is a park of the Adobe Design Intelligence Team for the Adobe Spark. Adobe Spark is part the current template design medium where layout, color pallets, and font pairings all come pre-selected with whatever current work and theme the user selects. Aside from the videos and webpages Spark can create, it functions very similarly to its main competitor Canva. Both of these programs are directed to the lowest common user- someone with no design experience who wishes to create high quality looking content for print, social media, etc. With this approach both Canva and Adobe Spark can be accessed online through a web browser or on most mobile devices through a phone application. They do not require a license or the downloading of a large program to run, and their workflow feels much like DesignScape in many ways. Users upload to the text and images they want on their page or pick from a set of stock images, then they can brainstorm by selecting various layouts and themes until they find a general direction they like. Finally, the user may make more final adjustments such as rotating, rescaling, or recoloring aspects of their design. Spark boasts that users can, "Create beautiful graphics, web pages, and video stories – in minutes," and through their use of well curated templates and themes it does not take long for someone to drop in some images and text then click the share button (Adobe Spark).

Another program making waves amongst the design community operates somewhere in the middle of the research field and consumer market. Powered by artificial intelligence, The Grid strives to make web building an autonomous process. The aim to nix the Wix style template approach entirely. One of its early investors, Jerry Yang, reportedly described the program as, "The Grid's cloud-based artificial intelligence

will reinvent web design by eliminating the mundane, time-consuming parts of web

development and creating elegant websites in a fraction of the time for a fraction of the

cost" (Wix). However, while it made a lot of commotion amongst web designers, those

that signed up for The Grid back in 2014 and paid their $96 for a fresh AI created website

were often left unimpressed. Complaints of bugs and simply a ridged design system that

lack customizability for specific functions drove a two start review on Merchant

Maverick, a business system review company, and many other users would feel the same

way (Vissers). That review was left back in 2017 and still today users are left waiting as

The Grid's main website thegrid.io simply contains a vaporwave-esque animation

showing that they are retiring version two and a promise that version three will be better,
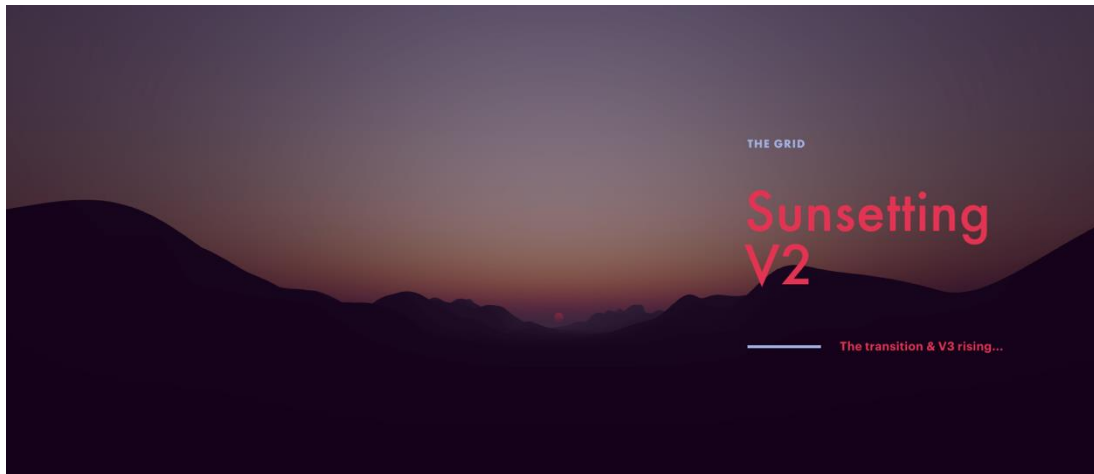
as pictured below in figure 8 (The Grid).

Figure 8 Splash page found on The Grid's website as of Spring 2019

The Grid isn't the only AI driven tool out there with other applications such as Impress.ly

which aims to do more or less the same thing as The Grid, but runs into many of the same

issues. When working with applications such as these it quickly becomes clear that they

are still in their infant stages with many kinks to work out, however as with anything,

creating a good product takes time and these are certainly the first steps toward complete AI driven web design.

Considering all the changes in the graphic design industry and the progress seen in automating graphic design there has been an explosion of articles and blog posts with titles such as, "Automation Threatens to Make Graphic Designers Obsolete" (Peart) or "When Websites Design Themselves" (Tselentis) with bold statements that, "a massive signal appears pointing to a future in which graphic designers are barely required at all" (Peart). Peter O'Donovan, speaking from his research background and his current experience working on Adobe Spark, shared:

"I don't think the designer is going away at all. It's almost like photography. It's not that the professional photographers are going away; they still do great work" (O'Donovan).

To understand the similarity O'Donovan is calling between photography and the future of graphic design, examine the difference between film cameras and the modern day DSLRs. Previously in the days of photographers such as Ansel Adams or Imogene Cunningham, the photographer would record his or her footage on film with no feedback until he or she processed the photo in a dark room. There was a huge barrier of mastery in understanding every aspect of the camera to achieve the best shot within the small number of photos that could be stored on the film at that time. Compare this to modern day with the DSLR, Digital Single-Lens Reflex, cameras that have become much more affordable (Hull). DSLR cameras give immediate feedback to the photographer and have created a more forgiving landscape within photography. "Quantity over quality" has become the mantra of new photographers. This is due to the immediate feedback

displayed on the screen coupled with the large storage size of SD cards allowing for

thousands of photos to be taken in one session. With that many pictures, even a novice

has a chance to snap a good shot, so there are a large number of people entering the scene

as "professional photographers." O'Donovan is claiming that just as expert photographers

are not harmed by more novices entering photography due to accessible technology,

expert designers will not be undermined either.

O'Donovan continues by saying that while the designer is not going away, he

does foresee a shift in the role of designers. He discusses how today, with the numerous

platforms and avenues of communication between company and consumer, there is a

larger demand for content creation than ever before (O'Donovan). Company designers are

tasked with creating for the ever-increasing number of web platforms such as Twitter,

Instagram, Snapchat, Facebook, and others which means more designs are needing to be

created. Currently, designers are still required to establish company brand and style

guidelines, and often top-level designers make templates that are used by those beneath

them to keep a consistent theme. O'Donovan does not foresee a dramatic change in this

system, but rather a shift to utilizing more automated design software, so the design team

can keep pace and increase their output. Rising design seniors at Georgia Southern feel

similarly to O'Donovan as when interviewing 14 of the students 100% claimed they do

not expect graphic designers to become obsolete in their lifetime. This outcome can be

expected as those students are currently studying to pursue a career in graphic design,

however interestingly enough, when informed of current trends in automated design 35%

said they were discouraged. When asked why they have been discouraged students

responded, "It is discouraging because this is apparently what passes for design." Other responses sounded a similar theme.

To quickly address some potential flaws in the data collected: the study was op-in so more moderate responses tend to be removed as those with polarizing opinions are more likely to opt in to a survey; the sample size is relatively small even though it is almost half of the graduating design class. Some methods of future improvement could include partnering with Universities to survey other student bodies past design seniors or possibly even surveying frequent users, as opposed to the creators, of a few automation assisted design programs listed to shed better light of their industry use.

Combining the analysis of current research and consumer market design trends coupled with the evolution of design and closely related fields showcases the dramatic and unpredictable effects of advancing technology. No one knows exactly what is in store for the future of design. Those lettering books and posters in 1435 most likely did not predict having to adapt their design process to incorporate the printing press just a year later. Even the designers during the 20th century most likely could have never expected the invention of computers would all but render many of their physical skills with graphite and paper unnecessary. However, while the use of pica rulers is less emphasized in modern times, the thinking behind the design process has stood the test of time. Understanding the principles behind a well-designed composition are necessary no matter the tools used for creation. Even programs which automate the process are many years away from being capable of inputting a processing the data required not to just output a pretty composition but understanding *when* to utilize a certain composition. It is in that gap that the human design thrives and will most likely continue to thrive for the

foreseeable future. Design education rises and falls not with its ability to equip students with the ability to design but rather with training a student's ability to think like a designer. The graphic designer as realized today will certainly grow obsolete should he or she be defined simply by his or her ability to manipulate tools such as Photoshop or InDesign while the thoughtful designer ready to adapt to the changing landscape will continue to shape how humans interact with the world around them.

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